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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,057	03/30/2004	Vladislav Sklyarevich	4403	5736

7590 11/29/2006

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EXAMINER	
SELLMAN, CACHET I	
ART UNIT	**PAPER NUMBER**
1762	

DATE MAILED: 11/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/814,057	SKLYAREVICH ET AL.	
	Examiner	Art Unit	
	Cachet I. Sellman	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 September 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Acknowledgement is made of the amendment filed by the applicant on 9/18/2006, in which claims 1,6 and 11 were amended and claim 5 was cancelled. Claims 1-4 and 6-12 are currently pending in U.S. Application Serial No. 10/814,057.

Response to Arguments

1. Applicant's arguments filed 9/18/2006 have been fully considered but they are not persuasive. The applicant states that the Sklyarevich reference (US 6424090 B1) is overcome by showing it is disqualified under 35 U.S.C 103 (c). However, the reference has a 102(b) date meaning it was published over a year prior to the filing date of the current application therefore the reference is still valid.

2. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning (claims 9 and 12), it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). As stated in the previous office action there is motivation to expose either surface of the ceramic through routine experimentation in order to ensure that the ceramic is uniformly heated and performs the intended function of heating the polymer

coating on the metal surface without degradation of the metal especially absent criticality in exposing either the top or bottom surface of the ceramic.

3. The applicant argues that the Apte et al. and Trankiem et al. reference do not suggest or teach ceramic materials having a melting point higher than 2000°C. The applicant states that "just because a reference teaches the use of a similar ceramic does not mean that the particular ceramic is capable of having a melting point higher than 2000°C." The reference of Apte et al. teaches the use of alpha alumina (Al_2O_3) ceramic and http://en.wikipedia.org/wiki/Aluminum_oxide teaches that alumina (Al_2O_3) has a melting point of 2054°C therefore the reference does teach the use of a ceramic having a melting point higher than 2000°C.

4. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection. The applicant has amended claim 1 to include the limitation of quasi-optically exposing the ceramic to a temperature within 1900 – 2000°C.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-4, 6-9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior Art (APA) in view of Guinmont (US 2003/0224115 A1), Sklyarevich (US 6424090 B1), Apte et al. (US 5072087) and Trankiem et al. (US 5477756).

The APA teaches a process for heat treating coatings by positioning a ceramic adjacent to the coating to be treated where the ceramic is irradiated by a microwave beam which results in the ceramic being heated to a temperature to heat the coating and adhere it to the metal substrate [0009 and Figure 1]. The APA also states that the heat treating can be used where the coating is a polymer and the substrate is a metal such as a blade [Figure 2 and 0024].

The APA does not teach that the ceramic is exposed quasi-optically and heated to a temperature of 1900-2000°C or that the metal surface is heated without temperature degradation of the metal as required by **claim 1**.

Guimont discloses a process for applying a coating containing fusible material to a cutting edge which is made of metal and heating the fusible material with microwave energy (abstract). Guimont teaches that the heating temperature, duration of heating must be adjusted to avoid any significant decomposition of the polymer or negative impact on the blade [0020].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of the APA to include adjusting the temperature to ensure there is no degradation of the metal as taught by Guimont. One would have been motivated to do so because both the APA and Guimont disclose processes fro applying a polymer coating to a metal substrate (blade edge) using microwave energy and Guimont further teaches that the temperature must be adjusted to ensure that there is no negative impact on the blade therefore one would have a reasonable expectation of success in applying the coating to the metal without damaging the metal substrate.

Sklyarevich teaches a system for increasing the power density distribution uniformity of a gyrotron radiation beam by providing a mirror for reflecting the beam onto an object to be irradiated (abstract). The mirror can be used to scan the beam over the object to be irradiated (col. 3, lines 44-50, col. 2, lines 42-44).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of the APA and Guimont to include exposing the ceramic to the microwave beam quasi-optically. One would have been motivated to do so because Guimont teaches the importance of having uniform heating and distribution and Skylarecvich teaches that the uniformity can be achieved using mirrors with a gyrotron beam therefore one would have a reasonable expectation of success in supplying uniform temperature and power distribution on the ceramic by using mirrors.

Trankiem et al. teaches a process for applying a polymer coating to a razor blade cutting edge where the coating is melted onto the blade by using a microwave source. Trankiem et al. further teaches that the use of microwave with metallic materials tend to result in arcing which can be detrimental to the razor blade cutting edge.

Apte et al. discloses a process for heat treating material that do not couple well wit microwave energy using microwave energy which involves the use of a microwave susceptor (a material compatible with microwaves) which generates heat in the material being heat treated (abstract). The susceptor material can be alumina (aluminum oxide). Apte et al. teaches that temperatures achieved by the process is about 1600 –2200°C (col. 3, lines 16-18).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of the APA and Guimont to use a ceramic to heat the coating. One would have been motivated to do so because Apte et al. teaches the use of alumina to heat substrates that are not compatible wit microwave beams and Trankium et al. teaches that applying microwave energy to metallic materials can result in arcing which can be detrimental to the metal and the APA is silent on the type of ceramic that is used in the process therefore one would have a reasonable expectation of success in using the alumina ceramic to heat the polymer coating in order to ensure that the metal blade would not be affected.

The APA does not teach using a gyrotron beam as required by **claim 2**.

However, Guimont discloses that in the process of coating a metal blade with a polymer and heating using microwave energy that several known and conventional microwave generators can be used such as a gyrotron [0018].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of the APA to include the gyrotron beam of Guimont. One would have been motivated to do so because the APA is silent on the type of microwave beam that is used in the process of heating a polymer coating on a metal blade and Guimont teaches that the gyrotron is a suitable microwave generator for the process therefore one would have a reasonable expectation of success is heating the polymer coating on the metal substrate using the gyrotron beam.

As stated above, Apte et al. teaches the use of aluminum oxide as the ceramic as required by **claim 3**.

The APA does not teach using a microwave beam frequency between 10 – 200 GHz as required by **claim 4**. However, Guimont teaches that the settings of the microwave beam should be adjusted to avoid any significant decomposition of the polymer or negative impact on the blade (metal) [0020]. Therefore the frequency is a

result effective variable and it would have been obvious to one having ordinary skill in the art to use the frequencies within the claimed range through routine experimentation in order to heat treat the polymer material without decomposition of the polymer or any negative impact on the metal especially absent any criticality in using the claimed range.

As stated above, Skylarecvich teaches using a metal mirror to deliver the microwave beam to the ceramic as required by **claim 6**. Skylarecvich teaches that the uniformity of power and configuration of the beam is formed by using the metal mirror as required by **claim 7**. Skylarecvich also teaches that the temperature distribution within the ceramic is formed by scanning microwave beam via the mirror as required by **claim 8**.

The APA does not teach exposing the top surface or the bottom surface of the ceramic to the microwave beam as required by **claims 9 and 12**. However, the APA and Guimont does not limit which surface of the ceramic is exposed to the microwave beam therefore it would have been obvious to one having ordinary skill in the art to expose either the top or bottom surface of the ceramic through routine experimentation in order to ensure that ceramic is uniformly heated and performs the intended function of heating the polymer coating on the metal surface without degradation of the metal especially absent any criticality in exposing either the top or bottom surface of the ceramic.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior Art (APA) in view of Guinmont (US 2003/0224115 A1), Sklyarevich (US

6424090 B1), Apte et al. (US 5072087) and Trankiem et al. (US 5477756) as applied to claim 1 and in further view of Huang (US 4833007).

The teachings of Admitted Prior Art (APA) in view of Guinmont, Sklyarevich, Apte et al. and Trankiem et al. as applied to claim 1 are as stated above.

The APA, Guinmont, Sklyarevich, Apte et al. and Trankiem et al. does not teach using a ceramic having a thickness equal to the skin layer at the selected frequency as required by **claim 10**.

Huang teaches a process for uniformly heating a material on the surface as well in the inside. Huang teaches that the quantity of a susceptor to microwave should be applied to a substrate in relation to the microwave skin depth to allow proper balance between reflection, absorption and transmission of the energy, which would optimize the surface heating, as well as the amount of energy transmitted. Huang states that the thickness should be an amount equivalent to or less than about twice the microwave skin depth (col. 6, lines 13-35).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of the APA, Guinmont, Sklyarevich, Apte et al. and Trankiem et al. to include using a ceramic having a thickness equal to the skin depth. One would have been motivated to do so because both disclose processes of

uniformly heating a substrate using heat transfer of microwave energy through a material that is susceptible to microwave energy to a substrate and Huang further teaches that the thickness of the susceptible material should be equal to or less than twice the skin depth to ensure uniform heating therefore one would have a reasonable expectation of success in uniformly heating the ceramic.

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior Art (APA) in view of Guinmont (US 2003/0224115 A1), Sklyarevich (US 6424090 B1), Apte et al. (US 5072087) and Trankiem et al. (US 5477756) as applied to claim 1 and in further view of Maeda et al. (US 4307277).

The teachings of Admitted Prior Art (APA) in view of Guinmont, Sklyarevich, Apte et al. and Trankiem et al. as applied to claim 1 are as stated above.

The APA, Guinmont, Sklyarevich, Apte et al. and Trankiem et al. does not teach using a ceramic having a thickness of 1-5 mm as required by **claim 11**.

Maeda et al. teaches a process of microwave heating where a material being heated is covered by a heat resistant material. The material being heated is heated by the heat transfer from the heat resistant material, which is heated by the microwave at a high temperature. The resistant material has a thickness of 1-10mm and causes great

induction loss. It would have been obvious to one having ordinary skill the art at the time the invention was made to modify the process of to include the ceramic having a thickness in the range of Maeda et al. One would have been motivated to do so because both disclose process of heating ceramic with a microwave to heat another object and Maeda et al. further teaches the thickness of the ceramic which results in uniform heating therefore one would have a reasonable expectation of success in uniformly heating the material.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cachet I. Sellman whose telephone number is 571-272-

0691. The examiner can normally be reached on Monday through Friday, 7:00 - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Cachet I Sellman
Examiner
Art Unit 1762

cis

TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER